

Art Unit: 2183

1. Claims 28-41 remain for examination. claim 42 is newly presented for examination.
2. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed. The current title is imprecise.
3. 35 USC § 101 reads as follows:

"Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter or any new and useful improvement thereof, may obtain a patent therefore, subject to the conditions and requirements of this title".
4. Claims 33-38 are rejected under 35 USC § 101 because the claimed invention is directed to non-statutory subject matter. Claims 33-38 are not limited to tangible embodiments. In view of Applicant's disclosure, specification page 7, lines 18-21, the definition of "computer readable medium" contained within the specification is not limited to tangible embodiments, instead being defined as including both tangible embodiments (e.g., "magnetic storage media, optical storage media", etc.) and intangible embodiments (e.g., communications media conveying signals encoding the instructions"). As such, the claim is not limited to statutory subject matter and is therefore non-statutory. Intangible embodiments, such as electromagnetic signals, are not patentable because they do not fall within one of the statutory classes of subject matter allowed by 35 USC § 101.

To define what is meant by a signal one must begin with basic concepts of the physical world. As explained in Gillespie et al., Chemistry 2 (Allyn and Bacon, Inc. 1986):

"We can describe the universe, and all the changes occurring in it, in terms of two fundamental concepts: matter and energy. Matter is anything that occupies space and has mass. Water, air, rocks, and petroleum, for example, are matter, but heat and light are not; they are forms of energy. The many different kinds of matter are known as substances. ..."

When referring to "structure" or "material" or "substance" what is being referred to is matter and things made up of matter. Energy is further defined at Chemistry 53:

"The capacity to do work is called energy. Gasoline, for example, possesses energy because when it is burned, it can do the work of moving a car. We measure energy by the work done, and thus energy, like work, is measured in joules.

In practice, it is convenient to distinguish different forms of energy, such as heat energy, light energy, electric energy, and chemical energy. ..."

Energy has physical existence because it is capable of doing work and of being measured, but is incorporeal.

The claimed electromagnetic signal is a form of electric energy which has physical existence as an electromagnetic wave in a communications path or as an electrical voltage in the circuits of a transmitter or receiver. This is distinguished from the use of the term signal to refer to an abstract quantity such as a number. See In re Walter, 618 F.2d 758, 770, 205 USPQ 397, 409 (CCPA 1980) ("The 'signals' processed by the inventions of claims 10-12 may represent either physical quantities or abstract quantities; the claims do not require one or the other").

The starting point for nonstatutory subject matter analysis is the statute, 35 USC § 101, and the Supreme Court's basic principles as enunciated in Diamond v. Diehr, 450 U.S. 175 (1981). As stated in In re Warmerdam, 33 F.3d 1354, 1358, 31 USPQ2d 1754, 1758 (Fed. Cir. 1994):

"Despite the oft-quoted statement in the legislative history of the 1952 Patent Act that Congress intended that statutory subject matter "include anything under the sun that is made by man," S. Rep. No. 1979, 82d Cong., 2d Sess., 5 (1952), reprinted in 1952 U.S.C.C.A.N. 2394, 2399; H.R. Rep. No. 1923, 82d Cong., 2d Sess., 6 (1952), Congress did not so mandate. Congress included in patentable subject matter only those things that qualify as "any . . . process, machine, manufacture, or composition of matter, or any . . . improvement thereof. . . ." 35 U.S.C. § 101. . .

To include some things is to exclude others. The chore of defining exactly what is excluded under § 101, and applying such definitions to specific cases, has caused courts to expend much effort in trying to find the right words to describe some rather abstract notions. In Diamond v. Diehr, 450 U.S. 175 (1981), the Supreme Court summarized the scope of the § 101 exclusion and the Court's prior efforts at describing it by saying "[e]xcluded from such patent protection are laws of nature, natural phenomena, and abstract ideas. . . . Our recent holdings in Gottschalk v. Benson and Parker v. Flook, both of which are computer-related, stand for no more than these long-established principles." Id. at 185.

Two comments are relevant. First, subject matter must first fall within § 101 before the exclusions apply. See In re Pardo, 684 F.2d 912, 916, 214 USPQ 673, 677 (CCPA 1982) ("[A]ny process, machine, manufacture, or composition of matter constitutes statutory subject matter unless it falls within a judicially determined exception to section 101."); In re Sarkar, 588 F.2d 1330, 1333, 200 USPQ 132, 137 (CCPA 1978) ("[A] series of steps is a 'process'

within § 101 unless it falls within a judicially determined category of nonstatutory subject matter exceptions."). Second, it is not certain that "laws of nature, natural phenomena, and abstract ideas" represent an exhaustive set of statutory subject matter exclusions, such that "laws of nature, natural phenomena, and abstract ideas" combined with the set of "process, machine, manufacture, or composition of matter" comprises a universal set all possible types of subject matter. Thus, subject matter is not presumed to be statutory under 35 U.S.C. § 101 if it does not fit within the enumerated exclusions of "laws of nature, natural phenomena, and abstract ideas." The proper analysis is to determine whether the claimed subject matter falls within one of the four classes of § 101 and, if so, whether the subject matter falls within one of the exclusions.

First the claimed signal is analyzed under the definitions of the four statutory classes of § 101. The claimed signal is clearly not a "process" under § 101 because it is not a series of steps. The other three § 101 classes of machine, compositions of matter and manufactures "relate to structural entities and can be grouped as 'product' claims in order to contrast them with process claims." D. Chisum, Patents § 1.02 (1994). The three product classes have traditionally required physical structure or material (matter).

"The term machine includes every mechanical device or combination of mechanical device or combination of mechanical powers and devices to perform some function and produce a certain effect or result." Corning v. Burden, 56 U.S. (15 How.) 252, 267 (1854). A modern definition of machine would no doubt include electronic devices which perform functions. Indeed, devices such as flip-flops and computers are referred to in computer science as sequential machines. The claimed signal has no physical structure, does not itself perform any useful, concrete and tangible result and, thus, does not fit within the definition of a machine.

A "composition of matter" "covers all compositions of two or more substances and includes all composite articles, whether they be results of chemical union, or of mechanical mixture, or whether they be gases, fluids, powders or solids." Shell Development Co. v.

Watson, 149 F. Supp. 279, 280, 113 USPQ 265, 266 (D.D.C. 1957), aff'd, 252 F.2d 861, 116 USPQ 428 (D.C. Cir. 1958). The claimed signal is not matter, but a form of energy, and therefore is not a composition of matter.

The Supreme Court has read the term "manufacture" in accordance with its dictionary definition to mean "the production of articles for use from raw or prepared materials by giving to these materials new forms, qualities, properties, or combinations, whether by hand-labor or by machinery." Diamond v. Chakrabarty, 447 U.S. 303, 308, 206 USPQ 193, 196-97 (1980) (quoting American Fruit Growers, Inc. v. Brogdex Co., 283 U.S. 1, 11, 8 USPQ 131, 133 (1931), which, in turn, quotes the Century Dictionary). Other courts have applied similar definitions. See American Disappearing Bed Co. v. Arnaelsteen, 182 F. 324, 325 (9th Cir. 1910), cert. denied, 220 U.S. 622 (1911). These definitions require physical substance, which the claimed signal does not have. Congress can be presumed to be aware of an administrative or judicial interpretation of a statute and to adopt that interpretation when it re-enacts a statute without change. Lorillard v. Pons, 434 U.S. 575, 580 (1978). Thus, Congress must be presumed to have been aware of the interpretation of manufacture in American Fruit Growers when it passed the 1952 Patent Act.

A manufacture is also defined as the residual class of product. Chisum, § 1.02[3] (citing W. Robinson, The Law of Patents for Useful Inventions 270 (1890)). A product is a tangible physical article or object, some form of matter, which the claimed signal is not. That the other two product classes, machine and composition of matter, require physical matter is evidence that a manufacture was also intended to require physical matter. The claimed signal, a form of energy, does not fall within either of the two definitions of manufacture.

Continuing to look at the § 101 class of manufacture, in In re Hruby, 373 F.2d 997, 153 USPQ 61 (CCPA 1967), the CCPA held that there was no distinction between the meaning of "manufacture" in § 101 and "article of manufacture" in § 171 for designs. The issue in Hruby was whether that portion of a water fountain which is composed entirely of water in motion was an article of manufacture. The CCPA relied on the analysis of the term

manufacture in Riter-Conley Mfg. Co. v. Aiken, 203 F. 699 (3d Cir.), cert. denied, 229 U.S. 617 (1913), a case involving a utility patent. The CCPA stated in Hruby, 373 F.2d at 1000, 153 USPQ at 65:

"The gist of it is, as one can determine from dictionaries, that a manufacture is anything made "by the hands of man" from raw materials, whether literally by hand or by machinery or by art."

The CCPA held that the fountain was made of the only substance fountains can be made of --water-- and determined that designs for water fountains were statutory. Articles of manufacture in designs manifestly require physical matter to provide substance for embodiment of the design. Thus, since "article of manufacture" under § 171 has the same meaning as "manufacture" under § 101, it is inevitable that a manufacture under § 101 requires physical matter.

Some indirect evidence that Congress intended to limit patentable subject matter to physical things and steps is found in 35 USC § 112 paragraph 6. Paragraph 6 states that an element in a claim for a combination may be expressed as a "means or step" for performing a function and will be construed to cover the corresponding "structure, material, or acts described in the specification and equivalents thereof." "Structure" and "material" indicate tangible things made of matter, not energy.

The claimed signal does not fit clearly within one of the three Diehr exclusions of "laws of nature, natural phenomena or abstract ideas." A signal may be an abstraction because it is disembodied in the sense of having no physical structure. Even if the signal were a signal in a wire, which requires movement of physical matter such as electrons, the signal is the propagating disturbance in the medium, not the medium itself. In any case, however, the exclusions are not controlling because subject matter must first fall within § 101 before the exclusions apply. Pardo and Sarkar, *supra*.

5. Claim 42 is rejected under 35 USC § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

"transferring said data a register of the processor"; (claim 42) This claim statement does not make grammatical sense. It appears that either one or more words are missing or that a different word should have been used instead of one or more of the chosen words.

6. Claims 28-42 are rejected under 35 USC § 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. This is a lack of written description rejection.
7. Claims 28-42 are rejected under 35 USC 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.
8. The rejections are respectfully maintained and incorporated by reference as set forth in the last office action, paper number 20080116, mailed January 22, 2008.
9. Applicant's arguments filed May 22, 2008 have been fully considered but they are not deemed to be persuasive.
10. In the remarks, applicant argues in substance:
 - A. That: "Applicants assert that since the claims are commensurate in scope with the Detailed Description, the claims satisfy the written description requirement regardless of whether the Specification discloses detail of how the invention as claimed and [sic] operates. In support, Applicants point to the "Written Description Training Materials," Revision 1, March 25, 2008, published by the United States Patent and Trademark Office which can be found at www.uspto.gov/web/menu/written.pdf, Appendix B and Appendix C of this document show decision trees for determining whether claims satisfy the written description requirement. As shown in Appendix C and Appendix, [sic, B] the written description requirement is satisfied if the claim is commensurate in scope with the Detailed Description." (emphasis in original)

This is not found persuasive because the appendices B and C of the above referenced document are both directed to determining whether a later filed continuation application is entitled to benefit of the priority date of an earlier filed parent application. Furthermore, it should be pointed out that if applicant were to have correctly utilized the appendices, the

correct flow would be first:

1. "Does claim assert benefit of an earlier filing date" - answer Yes - go to appendix C;
2. "Is each claim asserting benefit ... commensurate in scope with combined disclosure of ... priority ... application and the original claims?" - answer No - The reason this answer is "no" is that the claims which contain the limitation at issue were first introduced on November 7, 2007 and are narrower than the original claims of the priority application. Accordingly, the "and" clause can not be satisfied and the answer must be "no";
3. "Is the claim narrower in scope than the earlier disclosure and original claims?" - answer "Yes";
4. "If the claim adds additional limitations not present in the original claims, is there express, inherent, or implicit support for the claim as a whole?" - answer "No";
5. "Deny benefit of the earlier application's filing date."

Furthermore, if one were to follow appendix B of said document under the presumption that benefit were not claimed to an earlier application, the results would be as follows:

1. "Does the claim assert benefit of an earlier filing date" - answer "no" (assuming no benefit);
2. "Is each claim ... commensurate in scope with the combined disclosures ... and original claims" - answer "No";
3. "Is the claim narrower in scope than the specification and original claims?" - answer "Yes";
4. "If the claim adds additional limitations not present in the original claims, is there express, inherent, or implicit support for the claim as a whole" - answer "No";
5. "Make a written description rejection."

Therefore, the result of following both flowcharts correctly is that the present application claims are no longer entitled to benefit of the earlier filing date, and that a written description rejection should be applied to the present claims.

B. That: "The Office Action also rejects the claims as violating the enablement

requirements of 35 U.S.C. § 112, first paragraph. In rejecting the claims for lack of enablement, the Office Action again makes note that while the Specification details that it is possible to perform a transfer of non-contiguous memory locations via a single combined bus transfer, the Specification provides zero details as to how to perform this operation. While 35 U.S.C. § 112, first paragraph requires a disclosure that enables one of ordinary skill in the art to make and use the invention without undue experimentation, compliance with 35 U.S.C. § 112, first paragraph, does not require an indeed [sic] preferably omits what is well known in the art, and the fact that an experimentation by be complex does not necessary [sic] make it undue." (emphasis in original)

It is worthy of note that this statement by applicant is extremely close to admitting that the claim limitation at issue was well known in the art by others, and accordingly, was obvious to one of skill in the art that the time the invention was made. A rejection under 35 USC 103 is not being made because it is the examiner's belief that applicant did not intend the above quotation to appear to indicate that the claim limitation at issue was obvious to one of skill in the art.

- C. That: "Notwithstanding, Applicants assert that the Office Action fails to establish a *prima facie* basis for rejecting the claims as violating the enablement requirement of 35 U.S.C. § 112. To comply with 35 U.S.C. § 112, first paragraph, it is not necessary to "enable one of ordinary skill in the art to make and use a perfected, commercially viable embodiment absent and [sic] claim limitation to that effect."

This is not found persuasive because while applicant's are correct, the specification does not need to enable a perfected, commercially viable embodiment, the specification must enable one of skill in the art to make that which is claimed. The present specification, however, provides no guidance to one of skill in the art as to how to make a device as claimed that has the capability of transferring a plurality of non-contiguous data elements in memory in parallel across a processor memory bus. Several factors must be considered in order to reach a determination that a specification does not satisfy the enablement requirement. Those factors have been outlined in *In re Wands*, 858 F.2d, 731, 737, 8 USPQ2d 1400, 1404 (Fed. Cir. 1988). The factors are:

- (a) The breadth of the claims;
- (b) The nature of the invention;
- (c) The state of the prior art;
- (d) The level of one of ordinary skill;
- (e) The level of predictability in the art;
- (f) The amount of direction provided by the inventor;

- (g) The existence of working examples; and,
- (h) the quantity of experimentation needed to make or use the invention based on the content of the disclosure.

In regards to factor (a), the claims are quite broad, providing little detail beyond the functional recitation that plural data elements from non-contiguous memory locations are retrieved across a single memory bus in parallel.

In regards to factor (b), the nature of the invention is one of computer processor technology, so one of skill in the art would be presumed to be a computer processor design engineer working in industry.

In regards to factor (c), the state of the prior art, there has been no located prior art which details the transfer of plural non-contiguous memory locations in parallel across a single memory bus. Had such art been located, a rejection under either 35 USC § 102 or 103 would have been made.

In regards to factor (d), the level of one of ordinary skill would have been the above referenced computer design engineer working in industry having a bachelor's or master's of science degree in electrical or computer engineering.

In regards to factor (e), the level of predictability in the art is not high. The reasoning for this statement will be elaborated upon below. The result is that the ability of one of ordinary skill in the art to predict what invention applicant's may have been attempting to describe is very limited. So limited in fact as to be impossible to predict.

In regards to factor (f), as was detailed extensively in the prior office action (mailed January 22, 2008), the inventors provide no direction to one of skill in the art. They simply make the unsupported statement that it is possible for their system to retrieve non-contiguous data elements from memory in parallel. There is no direction given as to what invention the inventors had possession of, and there is no direction given as to how the invention supposedly performed this feat. They simply stated that it was possible for their system to achieve this feat. This provides no direction by the inventors to guide one of skill in the art to an understanding of how to make an invention that performs the same claimed feat.

In regards to factor (g), there are no disclosed working examples given by the inventors in the specification as filed. Therefore, one of ordinary skill is not assisted by analysis of a working example in determining how to make and/or use the invention.

In regards to factor (h), given that there are no working examples provided by the specification as filed, and given that the amount of direction provided by the inventors is at best minimal (a simple indication that their system can perform this function, with no further elaboration), and given that the ability of one of skill in the art to predict what invention applicant's may been attempting to describe is low to impossible, the quantity of experimentation required to determine how to make and/or use the invention that was minimally described by applicants is enormous.

In support of the examiner's assertion that the ability to predict the invention by one of skill in the art is minimal to impossible, pages 1-9 and 288-292 of *Computer Organization*, Second Edition by V. Carl Hamacher et al. is cited. Hamacher et al. is also evidence of what would be generally known to a person of ordinary skill in the art at the time the invention was made. As seen from Hamacher et al. (pg. 1, fig. 1.1), a memory is one of the basic functional units of a computer system. Page 5 of Hamacher et al. provides further details of what would have been known to one of ordinary skill in the art regarding the function and operation of a memory. Of note is the following statement from Hamacher et al.:

"The main memory contains a large number of semiconductor storage cells, each capable of storing 1 bit of information. These cells are rarely read or written as individual cells. Instead, they are processed in groups of fixed size called *words*. The main memory is organized so that the contents of one word, containing *n* bits, can be stored or retrieved in one basic operation." (emphasis in original)

The statements of note are the showing that 1) memory is processed in groups of fixed size called words, and 2) memory is organized so that one word is accessed in one basic operation. Further on page 5 Hamacher et al. state: "A typical access to the main memory results in one word of data being read from the memory or written into it.". On pg. 289, Hamacher et al. provides further elaboration upon the operation of a memory (termed "MM", where "MM" is defined on pg. 288) where the following statement is made:

"The MM is usually designed to store and retrieve data in word-length quantities. In fact, the number of bits actually stored or retrieved in one MM access is the most usual way of defining the word length of a computer."

Therefore, the facts that can be derived from this evidence provided by Hamacher et al. is that one of ordinary skill in the art at the time of invention can be presumed to have understood:

- 1) that memory is accessed in fixed size units called words; and,
- 2) that memory is organized such that one word is accessed in one basic operation.

Reconciling these facts with applicant's claimed invention results in the following:

- 1) claim 28 states that a transfer from memory to a processor of a plurality of data elements occurs. As applicant's claims are sufficiently broad enough that "data element" covers "one word" of memory, the claim will be analyzed from the viewpoint that the claimed "data element" is "one word" of memory. One of skill in the art can be presumed to understand that this claimed transfer would therefore occur as a set of "basic cycles" each "basic cycle" resulting in the transfer of "one memory word" of the plurality of memory words.;

- 2) claim 28 further states that the plurality of data elements are stored at non-contiguous locations in memory. One of skill in the art would have understood this to mean that the words were not stored in adjacent memory locations.

- 3) claim 28 further states that the transfer occurs "two or more" data elements (words) at a time. Given the facts known to one of skill in the art as evidenced by Hamacher et al., one of skill would have understood that one word of memory is transferred each cycle, but the claims have now required that two words of memory be transferred each cycle. Given the knowledge possessed by one of ordinary skill in the art at the time the invention was made, the claims have now required an impossibility to occur. One of skill would understand that memory transfers one word per cycle, but the claims have now required the memory to transfer two or more words per cycle, and further required that the two or more words also be located in non-adjacent locations in the memory.

At this point, one of ordinary skill in the art would not understand how applicant's

claimed invention could perform the impossible feat of transferring two or more non-contiguous words per cycle when a memory as known to one of skill transfers only one word per cycle. This is where one of skill would look to applicant's specification for illumination as to how they accomplished this very different memory access of being able to obtain two or more words per cycle from a memory that as known to one of skill provides only one word per cycle. One of skill would presume that applicant had invented some new memory design that could perform this new access function. However, upon reviewing the specification, one of skill is left with the fact that all the disclosure provides is the indication that it is possible to transfer two or more words from memory during one memory cycle. Looking first to the drawings, one of skill finds "main memory" defined as a simple box labeled "main memory" in fig. 1. No further illustration of the details of this main memory is provided by fig. 1. Figure 2 shows memory as a simple box labeled "DRAM" with no further illustration of any details of the memory. Figures 6a and 6b show memory as a simple box with four elements each inside. No further illustration of any details of the memory is provided by figs. 6a or 6b. Looking to the specification, one of skill finds on pg. 7 that the memory of fig. 1 is referenced simply as "main memory 110" with no further detail provided. In fact, in every instance throughout the entire specification, one of ordinary skill would have found the "memory" simply being referenced, but no details provided as to how this memory functions to transfer two or more words at one time when as known to one of skill in the art, a memory transfers only one word at one time. Even the suggestion given on pg. 27 that it is possible to do so is insufficient to illuminate to one of ordinary skill how to make the claimed invention. The suggestion on pg. 26 simply states that it is possible to pack two or more data elements into a larger block. But as one of ordinary skill would have known that memory can transfer only one data element at one time, one of ordinary skill is left guessing how applicant's invention achieves the feat of packing two or more data elements together and retrieving them from a memory that as known to one of ordinary skill can transfer only one element at one time. As a result of this, the level of predictability is extremely low, and the amount of experimentation

required to make and/or use the invention is excessively high. One of ordinary skill is left with having to independently re-invent everything that applicant's are claiming is their invention, with no guidance or direction as to how to make and/or use the invention given by applicant's. The result of this fact is that the specification lacks proper disclosure to meet the requirements of 35 USC § 112, first paragraph, for both written description and enablement of the now claimed invention.

11. A shortened statutory period for response to this action is set to expire 3 (three) months and 0 (zero) days from the mail date of this letter. Failure to respond within the period for response will result in **ABANDONMENT** of the application (see 35 USC 133, MPEP 710.02, 710.02(b)).

12. Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Richard Ellis whose telephone number is (571) 272-4165. The Examiner can normally be reached on Monday through Thursday from 7am to 5pm.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Eddie Chan, can be reached on (571) 272-4162. The fax phone number for the USPTO is: (703)872-9306.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (571) 272-2100.

/Richard Ellis/
Primary Examiner, Art Unit 2183
June 4, 2008